Attachments
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Prevalence of Black Lung Continues to Increase among U.S. Coal Miners

July 20, 2018

NIOSH Update:

New Report Shows Increase Most Pronounced in central Appalachia

One in ten underground coal miners who have worked in mines for at least 25 years were identified as having black lung, according to a new report by the National Institute for Occupational Safety and Health (NIOSH) published in the American Journal of Public HealthExternal. Coal miners in central Appalachia are disproportionately affected with as many as 1 in 5 having evidence of black lung–the highest level recorded in 25 years.

The data in this report come from NIOSH's Coal Workers Health Surveillance Program (CWHSP). NIOSH has operated the CWHSP and tracked the burden of black lung disease in underground coal miners since 1970. Through the Program, coal miners are offered periodic chest x-rays to detect early signs of black lung. For this study, NIOSH researchers looked at x-ray data collected by the CWHSP from working underground miners during 1970 to 2017.

This latest national estimate of 10 percent is higher than the previous NIOSH estimate last reported using data from 2012External, which found 7 percent of coal miners who worked more than 25 years in underground mines had evidence of black lung.

"Breathing coal mine dust is the sole cause of black lung, and it is entirely preventable," said David Blackley, DrPH, epidemiologist and one of the study's co-authors. "This study provides further evidence that effective dust control methods and protections to reduce coal mine dust exposure along with early detection of the disease are essential to protect miners' health."

A Steady Increase

By the late 1990s, the proportion of screened miners with black lung disease reached the lowest level on record. However, after that time, the trend reversed. Since 2000, the nationwide prevalence of black lung has increased. Recent NIOSH research indicates an unprecedented increase in progressive massive fibrosis

(PMF), the most severe form of black lung disease, after the prevalence of PMF had fallen to 0.08% among all miners examined by NIOSH in the CWHSP in the late 1990s.

While this is the first published report of the prevalence of black lung in the central Appalachian region, a 2016 report showed an uptick in the number of cases of PMF among working coal miners in Kentucky, Virginia and West Virginia.

The current prevalence of severe black lung in this part of the country is as high as it's been (5%) since record-keeping began in the early 1970s. Black lung disease is completely preventable and would not occur without hazardous coal mine dust exposures.

NIOSH Commitment

NIOSH is committed to addressing the current black lung epidemic and continues to work with partners to more fully define the scope of the problem and make recommendations. In addition to improving methods to control dust generated by mining activities, NIOSH scientists have recently worked to improve methods for detecting airborne coal mine dust to provide immediate warnings when dust levels are too high.

NIOSH continues to provide medical screening services to underground and surface coal miners so that they are informed of their health status and can take steps to protect it. Additionally, through its mobile outreach efforts, NIOSH is bringing medical screening to areas hit hardest by the epidemic.

For more information on the Coal Workers' Health Surveillance Program and NIOSH's Respiratory Health Division, please visit the NIOSH website.

NIOSH is the federal institute that conducts research and makes recommendations for preventing work-related injuries, illnesses, and deaths. For more information about NIOSH visit www.cdc.gov/niosh.

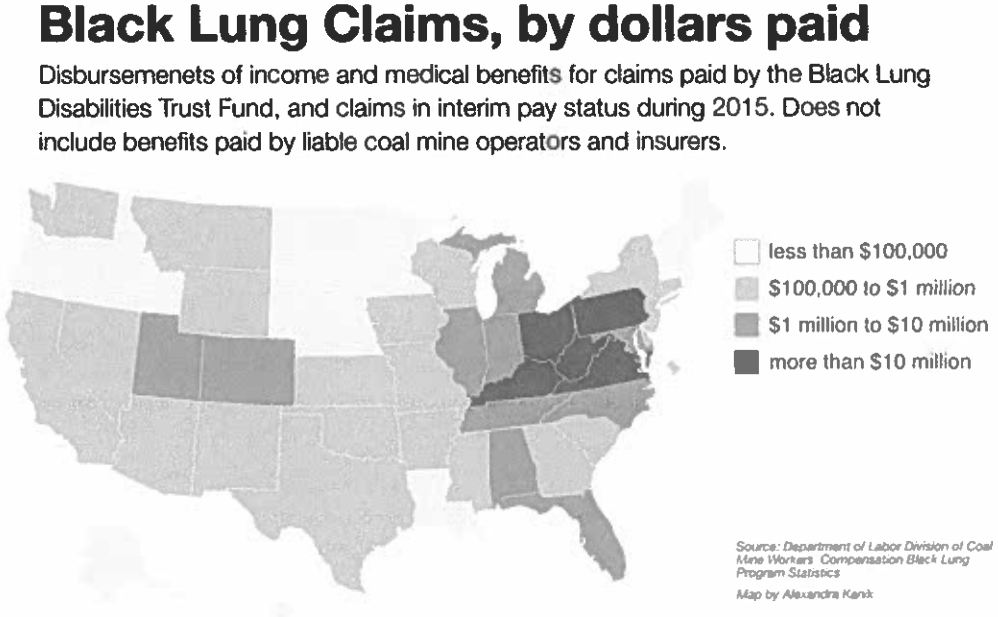
Rural Blog: CDC report shows black-lung disease on the rise for miners in Eastern Kentucky

Dec 19th, 2016

Black-lung disease is surging among Appalachian coal miners, according to a report by the federal Centers for Disease Control and Prevention and an investigation by Howard Berkes of NPR.

In June, Eastern Kentucky radiologist Brandon Crum contacted the National Institute for Occupational Safety and Health to report a surge in black-lung disease in the coal-mining area. The radiologist, who was not named, said 60 active or former coal mining patients examined in Pike County from Jan. 1, 2015 to Aug. 17, 2016 had radiographic findings consistent with progressive massive fibrosis, the most progressive form of black lung.

"I think the percentage of black lung that we're seeing now here in Central Appalachia is unprecedented in any recorded data that I can find anywhere," Crum told NPR. NIOSH epidemiologist Scott Laney told the network, "We had not seen cases of this magnitude ever before in history in Central Appalachia."



PMF cases in the region are "more than 10 times what federal regulators report," NPR reports, based on "data from 11 black lung clinics in Virginia, West Virginia, Pennsylvania and Ohio. "The true number is probably even higher, because some clinics had incomplete records and others declined to provide data."

The CDC report says, "The actual extent of PMF in U.S. coal miners remains unclear." Under the law, NIOSH can only test working miners, and many of them are reluctant to be examined for fear that a black-lung diagnosis would disqualify them from jobs with other coal operators; the last employer of a miner with black lung pays the benefits, Berkes notes.

The CDC did not identify the mining practices that led to the increase in cases, but slope mining and the economy were suggested as possible reasons, Bill Estep reports for the Lexington Herald-Leader.

Slope mining "involves using a continuous mining machine to cut through hundreds of feet of sandstone to reach coal seams, the report said," Estep notes. "Sandstone in Eastern Kentucky contains a high level of quartz, so slope mining could expose miners to hazardous dust with a high concentration of breathable crystalline silica, the report said."

It also was suggested that "many miners didn't seek examinations for the disease early in their careers for fear of losing a job or not being able to get a job, but have come forward more recently because the region has lost thousands of coal jobs and the miners are getting tested in order to seek benefits," Estep writes.

Berkes reports, "New and tougher federal limits on mine dust exposure fully took effect in August, and they get even tougher when there's excessive silica. Simple black lung and PMF can take a decade or longer to develop." The coal

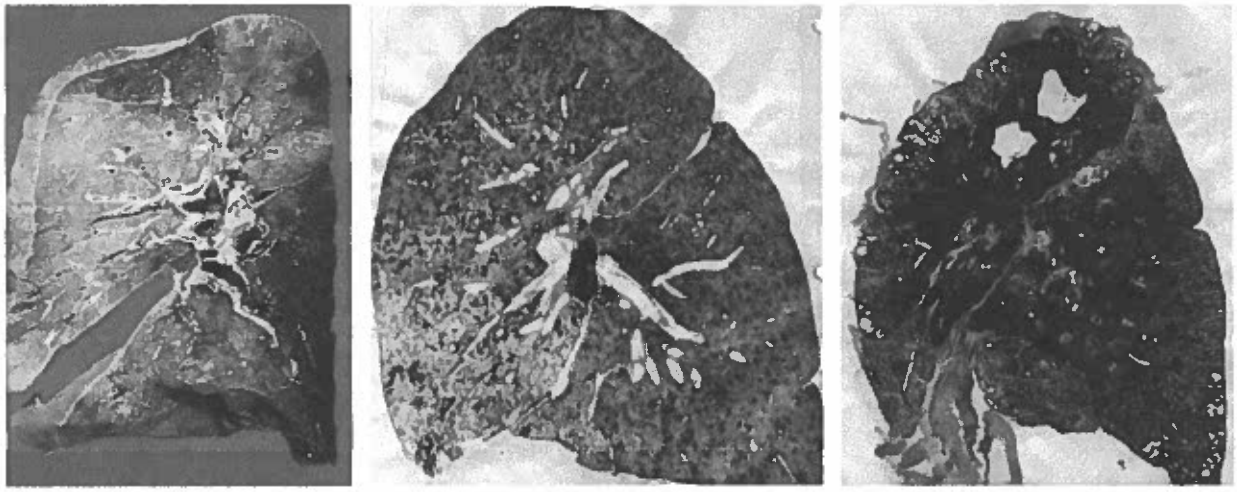
industry's decline may put the benefits in doubt. "The fund is nearly $6 billion in debt. It has taken on 1,000 claims that were covered by self-insured mining companies until they went bankrupt. And the coal excise tax that supports the fund is set for a 50 percent cut in two years."

Black Lung Disease Comes Storming Back in Coal Country

By NADJA POPOVICH FEB. 22, 2018

Federal investigators this month identified the largest cluster of advanced black lung cases ever officially recorded.

More than 400 coal miners frequenting three clinics in southwestern Virginia between 2013 and 2017 were found to have complicated black lung disease, an extreme form characterized by dense masses of scar tissue in the lungs.



Healthy lung
Simple black lung disease
Complicated black lung disease

National Institute for Occupational Safety and Health

The cluster, identified following an investigation by National Public Radio, adds to a growing body of evidence that a new black lung epidemic is emerging in central Appalachia, even as the Trump administration begins to review Obama-era coal dust limits.

The severity of the disease among miners at the Virginia clinics "knocked us back on our heels," said David J. Blackley, an epidemiologist at the National Institute for Occupational Safety and Health, who led the research published in the Journal of the American Medical Association. It was equally troubling, he said, that nearly a quarter of the miners with complicated black lung disease had been on the job fewer than 20 years.

Across the coal belt in Kentucky, West Virginia, and Virginia, "there's an unacceptably large number of younger miners who have end-stage disease and the only choice is to get a lung transplant or wait it out and die," Dr. Blackley said.

Scientists have linked the new wave of lung disease to miners breathing in more silica dust, the likely result of a decades-long shift toward mining thinner coal seams that require cutting into the surrounding rock. Silica dust from pulverized rock can damage lungs faster than coal dust alone.

Modern machinery, insufficient training for workers, and longer work hours may also contribute to increased dust exposure, experts say.

A Sharp Rise in Complicated Black Lung Disease

Black lung, a chronic disease caused by breathing in coal mine dust, declined precipitously between the early 1970s and late 1990s, following new health and safety rules put in place by the 1969 Coal Act. The legislation for the first time established airborne dust limits in coal mines and set up a health monitoring program for working miners, offering free chest x-rays every five years.

But by 2000, black lung was on the rise again. An advanced form of the disease, rarely seen in the mid-1990s, made an especially dramatic comeback.

The upward trend in severe black lung disease has been clear for some time, but "what we're really learning now is the magnitude of the problem," said Carl Werntz, an associate professor of occupational medicine at West Virginia University, who treats miners in Morgantown.

In addition to the Virginia cluster, Dr. Blackley's team previously found 60 miners with complicated black lung at a single clinic in eastern Kentucky. Overall, investigators have confirmed nearly 500 cases in just four clinics over the past four years. NPR, which began a wider survey of clinics in 2016, has unofficially recorded nearly 2,000 cases over a similar time period.

Those figures are far higher than the federal government's voluntary screening program for working miners, which recorded fewer than 100 cases of complicated black lung disease nationwide between 2011 and 2016. Researchers note that the true extent of black lung disease among current and former coal miners remains unclear.

New Rules for Coal Dust Under Review

To combat black lung disease, the Obama administration in 2014 issued a new coal dust rule. It lowered dust exposure limits for the first time in four decades, increased sampling frequency and required the use of real-time personal dust monitoring devices.

The rule was challenged by coal industry groups as costly and overly burdensome. A federal appeals court upheld it in 2016.

Last December, the Trump administration announced a retrospective review of the four-year-old regulation as part of a broader rule-cutting agenda, a move that alarmed mine safety advocates and medical experts.

"In light of these trends showing more debilitating disease, we need more protection, not less," said Judith Graber, an assistant professor at the Rutgers School of Public Health.

A Mine Safety and Health Administration spokesperson said that the agency's review was required and "will be used to determine if the 2014 rule is achieving its desired result." David Zatezalo, a former miner and coal industry executive who now leads the agency, told Congress on Feb. 6 that he has no current plans to roll back the updated dust limits.

Phil Smith, director of communications and governmental affairs for the United Mine Workers of America, said that if the rule isn't working, "then we need to beef it up even more."

A tenth of U.S. veteran coal miners have black lung disease: NIOSH

Richard Valdmanis

(Reuters) - More than 10 percent of America's coal miners with 25 or more years of experience have black lung disease, the highest rate recorded in roughly two decades, according to a government study released on Thursday that showed cases concentrated heavily in central Appalachia.

"Although many consider black lung a disease of antiquity, it is undeniable that … these contemporary cases resulted from injurious exposures encountered in the 21st century," the authors said in the report, published in the American Journal of Public Health.

The National Mining Association, which represents U.S. coal mining companies, has cast doubt on assertions that black lung disease is rebounding, arguing that miners are not required to participate in screenings.

"The exclusion of healthy individuals who self-select out of the program may skew the results – we won't know until more data is available," said NMA spokeswoman Ashley Burke.

The authors of the NIOSH report said that their findings underscored the need for stricter regulations as the administration of U.S President Donald Trump seeks industry feedback on coal dust policy enacted in 2014. The 2014 standards reduced allowable miner coal dust exposure in underground mines to 1.5 milligrams per cubic meter, from 2 mg/m3.

"Enhancement and diligent enforcement of the 2014 standards remains critical for reversing these trends," they wrote.

Burke said the NMA does not oppose the 2014 limits.

She added: "The study's findings are very troubling but, importantly, cover miners whose exposure dates back decades, before more rigorous standards were put into place."

APPALACHIAN CLUSTER

The highest rates of the disease are appearing in central Appalachian states like Kentucky and West Virginia, according to the report. In that region, a fifth of long-serving miners have black lung disease, and five percent have an advanced form considered completely debilitating.

"We can think of no other industry or workplace in the United States in which this would be considered acceptable," they wrote in the report.

Health officials, who have been flagging anecdotal evidence of increased rates of black lung for years in Appalachia, say miners in the region are plumbing the depths of played-out coal seams using heavy blasting equipment that can exacerbate dust exposure.

The National Academies of Sciences, Engineering and Medicine last month said that coal companies need to make a "fundamental shift" in how they control exposure to coal dust. It also urged regulators to enhance dust monitoring and conduct more research on the causes of the resurgence.

Meanwhile, a federal fund to aid victims of black lung disease could require a multi-billion dollar taxpayer bailout if Congress does not extend or increase the tax on coal production that funds it, the Government Accountability Office said last month.

Attachment
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End Black Lung
ACT NOW!

"I thought I was invincible." - Chester Fike, 35 years working in mines, suffering from black lung and waiting for a lung transplant

Video Resources

- The Faces of Black Lung

  Every year, about 1,000 miners die from coal workers' pneumoconiosis or 'black lung disease' caused by exposure to coal mine dust. Black lung disease continues to occur today, but that does not need to happen. Black lung disease and death are entirely preventable. You're about to hear from two coal miners. Both of these miners have been diagnosed with this devastating disease.

- Black Lung: A History

  This film chronicles the history of the WV and national movement of miners, doctors and Congressman to pass legislation, first in the WV Legislature, and then nationally in Congress, to protect miners from black lung.

Return to Black Lung Home Page Page

Attachment
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Coal Workers' Pneumoconiosis–Attributable Years of Potential Life Lost to Life Expectancy and Potential Life Lost Before Age 65 Years — United States, 1999–2016

Weekly / August 3, 2018 / 67(30);819–824

Jacek M. Mazurek, MD, PhD[1]; John Wood, MS[1]; David J. Blackley, DrPH[1]; David N. Weissman, MD[1]

Summary

What is already known about this topic?

Coal workers' pneumoconiosis (CWP) is a preventable occupational lung disease caused by inhaling coal mine dust; CWP can progress to respiratory failure and premature death.

What is added by this report?

During 1999–2016, the mean CWP-attributable years of potential life lost per decedent increased from 8.1 to 12.6 years, likely because of increased severity and rapid progression of CWP.

What are the implications for public health practice?

The continuing occurrence of premature deaths from CWP underscores the need for primary prevention by preventing hazardous exposures to coal mine dust, secondary prevention by early disease detection and prevention of further hazardous exposures, and tertiary prevention by providing appropriate medical care to persons with CWP.

Attachment
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Research Seeks Answers to Black Lung Resurgence in Central Appalachia

December 3, 2015 Matt Shipman

X-ray tech explaining the basics of a chest x-ray to a coal miner in Harlan County, KY as part of the Enhanced Coal Workers' Health Surveillance Program (black lung screening). This image retrieved via Wikimedia Commons. Click for more information.

Editor's Note: *This is a guest post from Nash Dunn, a writer in the communications office of the College of Humanities and Social Sciences. The post first appeared on the college site.*

For some, the words "black lung" may stir thoughts of a now irrelevant disease that was once responsible for the deaths of hundreds of thousands of miners. Unfortunately, it's back on the rise.

Between 1969 and 1999, cases of black lung, or coal workers' pneumoconiosis, among miners dropped from nearly 30 percent to 3 percent. But recent research shows that trend reversing in central Appalachia.

Aysha Bodenhamer, an NC State doctoral student, aims to find out what's led to the resurgence of black lung, and what miners, their families and the industry are doing about it.

Bodenhamer, who is pursuing her Ph.D. in sociology, is using a dissertation award from the Rural Sociological Society to start her research this fall. This project draws from the theoretical work on contested environmental illness, elite resistance and environmental health movements in an effort to examine environmental health activism surrounding black lung. Through interviews, fieldwork and secondary data analysis, Bodenhamer will study how central Appalachian communities are addressing the disease today.

"As a sociologist, I'm interested in the social dynamics surrounding black lung," Bodenhamer said." "For instance, what role does class and power play in prevention and compensation efforts? How are powerful actors contesting claims of black lung? And how are miners experiencing black lung?"

The disease, which is caused by the repeated inhalation of coal dust, can lead to lung impairment, disability and premature death, according to the CDC. Also, while complications from black lung can be treated, there is no effective treatment for the disease itself.

In the United States, where black lung has killed more than 200,000 former miners since 1900, the passage of the Coal Mine Health and Safety Act of 1969 led to a sharp drop-off in cases until recent years. The act, which has been amended over time, offered health benefits and compensation to miners with black lung.

"While there was a movement that led to the legislation being passed and a decrease in prevalence, now there's this second wave of cases," Bodenhamer said. "Is there something within this bureaucratic structure that's failed? What is it and what can we do about it?"

Bodenhamer's latest project builds off her broader research on mountaintop mining in central Appalachia. Also known as mountaintop removal, it's a form of surface mining where mountain summits are removed to expose coal seams.

The areas where most mountaintop mining operations are largely concentrated —West Virginia, eastern Kentucky and southwest Virginia — are also the places where the worst cases of black lung are clustered, Bodenhamer said.

"Surface miners, who were once exempt from some of the governmental regulations, are now among the leading groups being diagnosed with black lung," she said.

Bodenhamer started studying the effects of mountaintop mining while earning her bachelor's degree at Radford University. She continued to examine coal communities at NC State, where she earned her master's degree in sociology in 2013. Her thesis topic was, "Inequality in the Coalfields of West Virginia: Implications of Poverty, Paternalism, and Identity."

Black lung, she said, came up often during her thesis interviews and fieldwork, sparking her current interest.

"I wasn't aware it was still an issue and thought it was an age-old disease," Bodenhamer said. "But when I started looking into it, I saw the resurgence and realized there is much more work that needs to be done."

Attachment
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Undermining Safety:
A Report on Coal Mine Safety

By Christopher W. Shaw

Introduction by Ralph Nader

Center for Study of Responsive Law

About the Author

Christopher W. Shaw is a policy analyst at the Center for Study of Responsive Law. He is a graduate of Cornell University and a Ph.D. Candidate at the University of California. Shaw is the author of *Preserving the People's Post Office* (a CSRL publication by Essential Books, 2006).

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CHAPTER ONE

The Constant Threat

> *"The workers in the coal mining industry and their families have too long endured the constant threat and often sudden reality of disaster, disease and death.... Death in the mines can be as sudden as an explosion or a collapse of a roof or ribs, or it comes insidiously from pneumoconiosis, or black lung disease."*[1]
>
> -- President Richard M. Nixon, 1969

Coalmines are dangerous places – miners are continually engaging in the process of literally tearing the earth apart in order to extract its contents. Miners face the dangers posed by a falling roof underground and a caving high wall in an open-pit mine. Dust and gas create ever-present hazards: explosions can cause injury and death in a spectacular and immediate manner, or silently through persistent exposure that leads to lung disease and illness. "Of all places of work that can fill a worker with fear and anxiety," observed the noted sociologist Alvin W. Gouldner, "a mine is among the foremost."[2] Vigilant attention is required to ensure that miners do not fall victim to injury, illness, and death. The human toll exacted by America's mines is staggering. According to the United States Government, accidents in our coalmines claimed the lives of 104,574 miners between 1900 and 2005.[3] There were at least 365,000 deaths from

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[1] Richard Nixon, *Richard Nixon, 1969* (Washington, D.C.: G.P.O., 1971), 177.
[2] Alvin W. Gouldner, *Patterns of Industrial Bureaucracy* (New York: The Free Press, 1954), 113.
[3] MSHA, "Coal Fatalities for 1900 Through 2005," http://www.msha.gov/stats/centurystats/coalstats.htm Accidents in metal and non-metal mines claimed the lives of an additional 23,513 miners over the same period (MSHA, Metal/Nonmetal Fatalities for 1900 Through 2005," http://www.msha.gov/stats/centurystats/mnmstats.htm). Coalmine fatalities in America are one piece of a global crisis of worker death. Currently, every year about two million work-related deaths occur; men constitute two-thirds of these deaths (Paivi Hamalainen, Jukka Takala, and Kaija Leena Savela, "Global

pneumoconiosis ("black lung") by 1969, and a further 120,000 miners succumbed to the disease over the next thirty years.[4] Wendy B. Davis, a professor at the Appalachian School of Law, writes that "there is no dispute that mining historically has been one of the most dangerous professions, and continues to threaten the lives of those employed in the mines."[5]

Coalmines may be hidden away in rural areas far from the public eye, but they are by no means relics of the past. The front page of the *New York Times* declares that the venerable black fuel "Has a Bright Future."[6] It's all too easy amidst hype about the "New Economy" abounding in such publications as *Fast Company* to forget that the electricity actually stays on in bustling hubs of finance and technology like Manhattan and the Bay Area because coal continues to be mined in such places as West Virginia, Pennsylvania, and eastern Kentucky, southern Illinois, and Wyoming, Montana, and North Dakota.[7] But when disaster strikes, national attention suddenly focuses on coal

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Estimates of Fatal Work-Related Diseases," *American Journal of Industrial Medicine* 50, no. 1 (2007): 28-41).

[4] Lorin E. Kerr, "Black Lung," *Journal of Public Health Policy* 1, no. 1 (1980): 56; NIOSH, *Worker Health Chartbook 2004*, September 2004, http://www2.cdc.gov/niosh-chartbook/imagedetail.asp?imgid=214

[5] Wendy B. Davis, "Out of the Black Hole: Reclaiming the Crown of King Coal," 51 *American University Law Review* 905, 947 (2002).

[6] Douglas Jehl, "Fuel With a Dark Past Has a Bright Future," *New York Times*, June 16, 2001, A1. Serious concerns have been raised about the environmental consequences of anticipated increases in coal use. See Sierra Club, "Dirty Coal Power," http://www.sierraclub.org/cleanair/factsheets/power.asp; "Banks, Climate Change & the New Coal Rush," Rainforest Action Network, 2007; "The Dirty Truth About Coal: Why Yesterday's Technology Should Not Be Part of Tomorrow's Energy Future," Sierra Club, June 2007, 9-12; Bret Schulte, "A Texas Mess Over Coal," *U.S. News & World Report*, December 4, 2006; Travis Madsen and Rob Sargent, "Making Sense of the 'Coal Rush': The Consequences of Expanding America's Dependence on Coal," U.S. PIRG Education Fund, July 2006, 13-28; Jeff Goodell, *Big Coal: The Dirty Secret Behind America's Energy Future* (Boston: Houghton Mifflin Company, 2006), 119-46, 173-225; Bryan C. Banks, "High above the Environmental Decimation and Economic Domination of Eastern Kentucky, King Coal Remains Firmly Seated on Its Gilded Throne," 13 *Buffalo Environmental Law Journal* 125, 135-45 (2006); Mark Clayton, "America's new coal rush," *Christian Science Monitor*, February 26, 2004, 1.

[7] In 2005, 637,697 thousand tons of coal were mined west of the Mississippi (where most coal comes from surface mines), and 493,105 thousand tons were mined east of the Mississippi (where the majority of production is from underground mines). More coal was mined in Wyoming alone than in the next three largest coal producing states (West Virginia, Kentucky, and Pennsylvania) combined. Much less labor is

miners. "When it comes to occupational issues," in the words of consumer advocate Ralph Nader, "the media are very disaster prone.... They will cover a coal mine disaster because people have died."[8]

In January 2006, the national media descended on West Virginia to cover the mine disaster at Sago. A few years previously news coverage briefly fastened upon the Quecreek disaster in Pennsylvania. Twenty-four hour television news coverage will focus on the human drama of a mining disaster from the moment camera crews first swoop in, to the point where they pack up and leave, scurrying off to the next event.[9] "First the disaster. Then the weeping. Then the outrage. And we are all too familiar with what comes next!" states Senator Robert C. Byrd (D-West Virginia). "After a few weeks, when the cameras are gone, when the ink on the editorials has dried, everything returns to business as usual. The health and safety of America's coal miners, the men and women upon whom the Nation depends so much, is once again forgotten until the next explosion."[10]

Significant mine safety legislation can result from these flurries of attention, however. "For decades until 1969," the *New York Times* reveals, "the industry

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required to extract coal from surface mines: only one fifth of all coal miners are employed west of the Mississippi. There are more miners in West Virginia (18,611 in 2005) than in any other state.

[8] Ralph Nader, "Occupational Safety and Health Act," 31 *Houston Law Review* 1, 6 (1994).

[9] According to author Neil Postman: "Entertainment is the supra-ideology of all discourse on television" (Neil Postman, *Amusing Ourselves to Death: Public Discourse in the Age of Show Business* (New York: Penguin Books, 1986), 87). Observers frequently decry superficial news coverage For example, see Dell Champlin and Janet Knoedler, "Operating in the Public Interest or in Pursuit of Private Profits?: News in the Age of Media Consolidation," *Journal of Economic Issues* 36, no. 2 (2002): 459-68; Trudy Lieberman, *Slanting the Story: The Forces That Shape the News* (New York: New Press, 2000), 151-161; Ben H. Bagdikian, *The Media Monopoly* (Boston: Beacon Press, 2000), xxvii-xxix, 212-218; Robert W. McChesney, *Rich Media, Poor Democracy: Communication Politics in Dubious Times* (New York: New Press, 1999), 48-77; James Fallows, *Breaking the News: How the Media Undermine American Democracy* (New York: Pantheon Books, 1996), 129-81.

[10] *Congressional Record*, January 25, 2006: S58.

successfully fought the passage of stringent federal mine safety laws."[11] But in 1968 disaster struck at Farmington, West Virginia and claimed the lives of 78 miners. The aftermath was beamed into the television sets of America's living rooms direct from the site of the tragedy. The Federal Coal Mine Health and Safety Act was enacted the following year. Sago had the same effect: Momentum for Congressional action was insurmountable, and quickly led to passage of the Mine Improvement and New Emergency Response Act of 2006 (MINER Act). While the suffering mine accidents cause can provoke swift action, our challenge as a nation when it comes to mine safety is maintaining a sense of urgency when the media's cameras aren't facilitating overwhelming public scrutiny. Tim Baker, deputy administrator for health and safety with the United Mine Workers of America (UMWA), believes that if recent mine fatalities had occurred "one or two at a time we wouldn't have had the MINER Act."[12]

The editor of *Mine Safety and Health News*, Ellen Smith, points out that "[m]ining is dangerous, but it can be done safely. You need a safety net."[13] But for miners employed in an industry, where one constant has been mine operators who jeopardize workers' lives and wellbeing, achieving health and safety legislation has been no easy feat. "As long as the law didn't require safety measures," writes Duane Lockard, professor of politics emeritus at Princeton University, "American mine owners played percentage poker – treating lives as relatively low-cost poker chips and making a bundle in the process."[14] According to Perry K. Blatz, professor of history at Duquesne

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[11] Ben A. Franklin, "Coal Operators and Union Agree to Improve Safety," *New York Times*, September 23, 1979, 25.
[12] Interview, August 24, 2006.
[13] Dolores Orman, "Local mine expert suddenly in demand," *Rochester Democrat & Chronicle*, January 15, 2006, 3B.
[14] Duane Lockard, *Coal: A Memoir and Critique* (Charlottesville, Va.: University Press of Virginia, 1998), 31.

University, nineteenth century Pennsylvania coal operators established a system "in which production, not safety, stood as the paramount goal."[15] The human toll would mount over the succeeding decades. For every 10,000 American coal miners, an average of 33.5 were killed every year from 1900 through 1906. Comparisons with other nations reveal this figure to be an inexcusably high rate of death, as during this same period the mortality rate was 10.3 in Belgium, 12.9 in Britain, 9.1 in France, and 20.6 in Prussia.[16] Injuries were routine; for example, 29, 172 anthracite miners were injured in 1923, and 30,241 were injured the following year.[17] In a ten-year span from 1935 to 1945 there were a total of 639,000 disabling accidents in the nation's mines.[18]

In spite of the overwhelming danger made blatantly apparent by numbers such as these, coal operators have staunchly resisted health and safety regulations. They were adamant in their opposition to the Mine Inspection Act of 1941, which gave federal mine inspectors the right to enter mines, inspect them, and make non-binding recommendations to their owners. Operators opposing such federal authority called it an example of "sheer communism."[19] Likewise, efforts made after Farmington to improve conditions in the mines met with a torrent of opposition. The National Independent Coal Operators' Association and the Harlan County Coal Operators' Association joined together in opposition against the push for federal mine health and safety legislation that

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[15] Perry K. Blatz, *Democratic Miners: Work and Labor Relations in the Anthracite Industry, 1875-1925* (Albany: SUNY Press, 1994), 28.
[16] Michael B. Katz, *In the Shadow of the Poorhouse: A Social History of Welfare in America* (New York: Basic Books, 1996), 198.
[17] William Green, "The Need for Safety from the Worker's Point of View," *Annals of the American Academy of Political and Social Science* 123 (1926): 4.
[18] Robert H. Zieger, *John L. Lewis, Labor Leader* (Boston: Twayne Publishers, 1988), 151.
[19] Michael Wallace, "Dying for Coal: The Struggle for Health and Safety Conditions in American Coal Mining, 1930-82," *Social Forces* 66, no. 2 (1987): 340.

coalesced around the Farmington disaster.[20] The *New York Times* reported that "coal operators, or some of them, have taken the position that pneumoconiosis does not exist."[21] The West Virginia Coal Association denounced proposed state legislation designed to address the debilitating illness as "galloping socialism in one of its purest forms."[22] In the words of industrial hygienist James L. Weeks, "Mine operators…vigorously opposed the Coal Mine Health and Safety Act of 1969. They said it was unnecessary, unfeasible, and unconstitutional."[23]

Congress passed the legislation in spite of such opposition; and it had an immediate positive effect on conditions. The 1969 Coal Act's successor – the Federal Mine Safety and Health Act of 1977 – helped to cement these advances, and established the Mine Safety and Health Administration (MSHA) within the Department of Labor. The National Institute for Occupational Safety and Health reports that "[f]atality rates decreased following the passage of these two Federal mine acts."[24]

Federal legislation put an end once and for all to industry self-regulation; however, at times operators have flaunted the laws in a flagrant manner. These violations have periodically been endemic and apparently systematic. For instance, in 1991 MSHA fined half of the nation's coal operators $7 million for tampering with coal dust samples in 847 underground mines.[25] Labor Secretary Lynn M. Martin stated: "I am appalled by

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[20] *The Independent Coal Operator*, June 1969, 8.
[21] Ben A. Franklin, "The Scandal of Death And Injury In the Mines," *New York Times Magazine*, March 30, 1969.
[22] Alan Derickson, *Black Lung: Anatomy of a Public Health Disaster* (Ithaca: Cornell University Press, 1998), 160.
[23] James L. Weeks, "The Fox Guarding the Chicken Coop: Monitoring Exposure to Respirable Coal Mine Dust, 1969–2000," *American Journal of Public Health* 93, no. 8 (2003): 1236.
[24] NIOSH, *Worker Health Chartbook, 2000*, September 2000, http://www2.cdc.gov/chartbook/chap6/chartbk6.htm
[25] Frank Swoboda, "Task Force Will Consider Changes In Coal Dust Testing," *Washington Post*, April 18, 1991, B13.

the flagrant disregard for a law designed to protect coal miners against disabling lung disease that is represented by the widespread tampering we have uncovered. We are talking about tampering with people's lives."[26] "This is not 800 choices by individuals," said mine safety expert J. Davitt McAteer. "This is a systematic approach. This is a scheme."[27] Coal companies pled guilty to criminal charges, including the nation's largest coal producer – Peabody Coal Co., which had admitted tampering with safety devices in 1982 as well.[28] Such corporate actions serve to demonstrate the ugly reality that for coal companies production, not safety, serves as the overriding imperative. And this state of affairs can exist even in the immediate wake of an accident. "I'm always very dismayed when companies are far more concerned about when they can get back on coal – producing again – then on why the accident occurred," says former MSHA official Tony Oppegard. "I've known operators who cared far more about producing coal than this guy who got killed yesterday. They say safety is the top priority. In reality it's not in my experience."[29]

Mine safety laws can only provide real protection to miners when they are vigorously enforced by MSHA. "This is not an industry that can be trusted to self-regulate," according to Tim Baker of the UMWA. "History shows that. I've been in mining for 30 years. The only thing most mine operators care about is if you take money

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[26] Frank Swoboda, "Martin Hits Coal Industry in Tampering Probe," *Washington Post*, April 16, 1991, D1.
[27] Frank Swoboda, "Coal Mine Operators Altered Dust Samples," *Washington Post,* April 4, 1991, A1.
[28] Keith Schneider, "Coal Company Admits Safety Test Fraud," *New York Times*, January 19, 1991, 14. In 1984, the *Philadelphia Inquirer* reported that five companies – including Peabody – had been convicted for submitting falsified dust samples. In one instance a safety official at Westmoreland Coal Co. "routinely threw out samples that appeared to have too much dust, and instead sent the government phony clean samples." The *Inquirer* revealed: "In interviews, scores of miners, health experts who have monitored the system and federal investigators have said that this elaborate regulation system is frequently circumvented, often on a daily basis" (Lucinda Fleeson, "The Choice: Health or Job," *Philadelphia Inquirer*, September 18, 1984, A1).
[29] Interview, July 26, 2006.

out of their pocket."[30] Recently, MSHA has emphasized "cooperation" with industry. Altering the tenor of the agency's efforts by deemphasizing MSHA's enforcement tools can compromise the law's effectiveness. Former MSHA head Davitt McAteer believes that "if we remove from the highways of California the state highway patrol some of us would continue to drive in a responsible way, but others would speed. The presence of the police force helps us keep in compliance....There's always that 10 to 15 percent who are scofflaws. The same principle applies to the workplace."[31]

Industry, however, approves of the "cooperation" approach. Bruce Watzman, vice president of safety and health for the National Mining Association, wants MSHA to avoid "policies that inevitably lead to unnecessary and unproductive confrontation."[32] This statement misleadingly suggests that enforcing the law leads to confrontations that are "unnecessary." Regulations by definition are intended to be enforced. They require enforcement because otherwise they become hollow, empty, meaningless, and ultimately not worth the paper they're printed on. Susan P. Baker, professor of public health at Johns Hopkins University, says, "Until the fine for ignoring a hazard is bigger than the cost of fixing the hazard, a lot of employers won't do anything."[33]

However, when the George W. Bush Administration assumed office in 2001, it moved to favor industry rather than miners by placing a definite emphasis on MSHA

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[30] Jane M. Von Bergen, "Safety isn't Priority, Union Executive says," *Philadelphia Inquirer*, January 5, 2006, A14.

[31] Interview, September 1, 2006. For the safety implications of speed limits see Insurance Institute for Highway Safety, *Status Report* 38, no. 10 (2003); Herbert M. Baum, Adrian K. Lund, and JoAnn K. Wells, "The Mortality Consequences of Raising the Speed Limit to 65 MPH on Rural Interstates," *American Journal of Public Health* 79, no. 10 (1989): 1392-1395; Willard J. Kemper and Stanley R. Byington, "Safety Aspects of the National 55 MPH Speed Limit," *Public Roads* 41, no. 2 (1977): 58-67; Brock Adams, *Report to the President on compliance with the 55 mph speed limit* (Washington, D.C.: U.S. Department of Transportation,1977); Tim M. Borg, *Evaluation of the 55 Mph Speed Limit: Final Report* (West Lafayette, Ind.: Purdue University Engineering Experiment Station, 1975).

[32] House Committee on Education and the Workforce, Subcommittee on Workforce Protections, *Mine Safety*, 109th Congress, second session, March 1, 2006.

[33] Mike Casey, "OSHA: Discounted lives," *Kansas City Star*, December 11, 2005.

avoiding "adversarial regulations." The administration's rhetorical application of the word "adversarial" to a proper functioning of the agency, which is designed to ensure compliance with federal mining laws, reflects this change. "What are adversarial regulations?" asks Richard L. Trumka, secretary-treasurer of the AFL-CIO. "Is a speed limit an adversarial regulation?"[34] A speed limit becomes "adversarial" when a driver decides to break the law by going 60 mph in a 30 mph zone because it is at that moment that the police take on an opposing role. Regulations acquire an adversarial or confrontational nature only when they are broken and enforcement becomes necessary.

Enforcing the law and constantly keeping abreast of recent technological developments are the foremost ways MSHA can make mining deaths, injuries, and illnesses less likely. Improving mine safety depends on a continual upgrading of existing standards. Advances in technology and knowledge need to be implemented on an ongoing basis, as they are made available. And once again it falls to government, through such means as active rulemaking, to take the lead in forcing industry to act. Coal companies are not likely to voluntarily choose to invest money in new safety technologies. "[T]he coal mine industry is one where there is often extreme conflict between the public and private goals," according to Senator Paul Simon. "The industry at times has fallen victim, by some, to a safety versus profit equation.... Competition will instantly push some coal operators to pursue profits over safety."[35] Operators are in business to make a profit, and are therefore naturally focused on production. Improving safety often requires an investment that does not immediately boost production levels, or

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[34] Interview, July 7, 2006.

[35] House Committee on Education and Labor, Subcommittee on Health and Safety, *MSHA Oversight Hearings on Coal Mine Explosions During December 1981 and January 1982*, 97th Congress, second session (Washington, D.C.: G.P.O., 1982), 290.

self-evidently widen profit margins. Regulators, therefore, are obliged to give mine owners a helpful push in the right direction.

Applying a humane approach to occupational safety can reduce much human suffering for the families as well as the victims. "The most important thing is to prevent disasters to begin with," says Trumka. "These aren't acts of God. These acts are of man. You don't have to have disasters: they can be prevented. Either the law was enough and wasn't followed, or it wasn't strong enough."[36] Our challenge as a nation, and our responsibility to our miners, is to ensure that laws are in place that are strong enough to provide adequate protections, and that they are obeyed.

[36] Interview, July 7, 2006.

Attachment
9

Federal Coal Mine Health and Safety Act of 1969
Public Law 91-173*
91st Congress, S. 2917
December 30, 1969

Dust Standard and Respiratory Equipment

. 202. (a) Each operator of a coal mine shall take accurate samples of the amount of respirable dust in the mine atmosphere to which each miner in the active workings of such mine is exposed. Such samples shall be taken by any device approved by the Secretary and the Secretary of Health, Education, and Welfare and in accordance with such methods, at such locations, at such intervals, and in such manner as the Secretaries shall prescribe in the Federal Register within sixty days of enactment of this Act and from time to time thereafter. Such samples shall be transmitted to the Secretary in a manner established by him, and analyzed and recorded by him in a manner that will assure application of the provisions of section 104(i) of this title when the applicable limit on the concentration of respirable dust required to be maintained under this section is exceeded. The results of such samples shall also be made available to the operator. Each operator shall report and certify to the Secretary at such intervals as the Secretary may require as to the conditions in the active workings of the coal mine, including, but not limited to, the average number of working hours worked during each shift, the quantity and velocity of air regularly reaching the working faces, the method of mining, the amount and pressure of the water, if any, reaching the working faces, and the number, location, and type of sprays, if any, used.

(b) Except as otherwise provided in this subsection –

(1) Effective on the operative date of this subchapter, each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings of such mine is exposed at or below 3.0 milligrams of respirable dust per cubic meter of air.

(2) Effective three years after the date of enactment of this Act, each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings of such mine is exposed at or below 2.0 milligrams of respirable dust per cubic meter of air.

(3) Any operator who determines that he will be unable, using available technology, to comply with the provisions of paragraph (1) of this subsection, or the provisions of paragraph (2) of this subsection, as appropriate, may file with the Panel, no later than sixty days prior to the effective date of the applicable respirable dust standard established by such paragraphs, an application for a permit for noncompliance. If, in the case of an application for a permit for noncompliance with the 3.0 milligram standard established by

paragraph (1) of this subsection, the application satisfies the requirements of subsection (c) of this section, the Panel shall issue a permit for noncompliance to the operator. If, in the case of an application for a permit for noncompliance with the 2.0 milligram standard established by paragraph (2) of this subsection, the application satisfies the requirements of subsection (c) of this section and the Panel determines that the applicant will be unable to comply with such standard, the Panel shall issue to the operator a permit for noncompliance.

(4) In any case in which an operator, who has been issued a permit (including a renewal permit) for noncompliance under this section, determines, not more than ninety days prior to the expiration date of such permit, that he still is unable to comply with the standard established by paragraph (1) of this subsection or the standard established by Paragraph (2) of this subsection, as appropriate, he may file with the Panel an application for renewal of the permit. Upon receipt of such application, the Panel, if it determines, after all interested persons have been notified and given an opportunity for a public hearing under section 5 of this Act, that the application is in compliance with the provisions of subsection (c) of this section, and that the applicant will be unable to comply with such standard, may renew the permit.

(5) Any such permit or renewal thereof so issued shall be in effect for a period not to exceed one year and shall entitle the permittee during such period to maintain continuously the average concentration of respirable dust in the mine atmosphere during each shift in the working places of such mine to which the permit applies at a level specified by the Panel, which shall be at the lowest level which the application shows the conditions, technology applicable to such mine, and other available and effective control techniques and methods will permit, but in no event shall such level exceed 4.5 milligrams of dust per cubic meter of air during the period when the 3.0 milligram standard is in effect, or 3.0 milligrams of dust per cubic meter of air during the period when the 2.0 milligram standard is in effect.

(6) No permit or renewal thereof for noncompliance shall entitle any operator to an extension of time beyond eighteen months from the date of enactment of this Act to comply with the 3.0 milligram standard established by paragraph (1) of this subsection, or beyond seventy-two months from the date of enactment of this Act to comply with the 2.0 milligram standard established by paragraph (2) of this subsection.

(c) Any application for an initial or renewal permit made pursuant to this section shall contain --

(1) a representation by the applicant and the engineer conducting the survey referred to in paragraph (2) of this subsection that the applicant is unable to comply with the standard applicable under subsection (b)(1) or (b)(2) of this section at specified working places because the technology for

reducing the concentration of respirable dust at such places is not available, or because of the lack of other effective control techniques or methods, or because of any combination of such reasons;

(2) an identification of the working places in such mine for which the permit is requested; the results of an engineering survey by a certified engineer of the respirable dust conditions of each working place of the mine with respect to which such application is filed and the ability to reduce such dust to the level required to be maintained in such place under this section; a description of the ventilation system of the mine and its capacity; the quantity and velocity of air regularly reaching the working faces; the method of mining; the amount and pressure of the water, if any, reaching the working faces; the number, location, and type of sprays, if any; action taken to reduce such dust; and such other information as the Panel may require; and

(3) statements by the applicant and the engineer conducting such survey, of the means and methods to be employed to achieve compliance with the applicable standard, the progress made toward achieving compliance, and an estimate of when compliance can be achieved.

(d) Beginning six months after the operative date of this subchapter and from time to time thereafter, the Secretary of Health, Education, and Welfare shall establish, in accordance with the provisions of section 101 of this Act, a schedule reducing the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings is exposed below the levels established in this section to a level of personal exposure which will prevent new incidences of respiratory disease and the further development of such disease in any person. Such schedule shall specify the minimum time necessary to achieve such levels taking into consideration present and future advancements in technology to reach these levels.

(e) References to concentrations of respirable dust in this subchapter means the average concentration of respirable dust if measured with an MRE instrument or such equivalent concentrations if measured with another device approved by the Secretary and the Secretary of Health, Education, and Welfare. As used in this subchapter, the term "MRE instrument" means the gravimetric dust sampler with four channel horizontal elutriator developed by the Mining Research Establishment of the National Coal Board, London, England.

(f) For the purpose of this subchapter, the term "average concentration" means a determination which accurately represents the atmospheric conditions with regard to respirable dust to which each miner in the active workings of a mine is exposed (1) as measured, during the 18 month period following the date of enactment of this Act, over a number of continuous production shifts to be determined by the Secretary and the Secretary of Health, Education, and Welfare, and (2) as measured thereafter, over a single shift only, unless the Secretary and the

Secretary of Health, Education, and Welfare find, in accordance with the provisions of section 101 of this Act, that such single shift measurement will not, after applying valid statistical techniques to such measurement, accurately represent such atmospheric conditions during such shift.

(g) The Secretary shall cause to be made such frequent spot inspections as he deems appropriate of the active workings of coal mines for the purpose of obtaining compliance with the provisions of this subchapter.

(h) Respiratory equipment approved by the Secretary and the Secretary of Health, Education, and Welfare shall be made available to all persons whenever exposed to concentrations of respirable dust in excess of the levels required to be maintained under this chapter. Use of respirators shall not be substituted for environmental control measures in the active workings. Each operator shall maintain a supply of respiratory equipment adequate to deal with occurrences of concentrations of respirable dust the mine atmosphere in excess of the levels required to be maintained under this chapter.

Attachment
10

The Fox Guarding

the Chicken Coop: Monitoring Exposure to Respirable Coal Mine Dust, 1969–2000

| James L. Weeks, ScD, CIH

CORRUPTION, AGAIN

Corruption resurfaced early in the 1990s. MSHA discovered "abnormal white centers" (AWCs) in sampling filters; it looked like dust had been blown off the filters in order to reduce their weight. The occurrence of these AWCs was widespread, coming from approximately 1 out of 3 mines in the United States. Ironically, it was the secretary of labor of a Republican administration (that of George H. W. Bush), Lynn Martin, who used exceptionally inflammatory language when she announced citations. She accused the industry of having an "addiction to cheating," a characterization that infuriated industry leaders.16 Not only did they want the citations withdrawn, they also wanted their honor restored.

Following this announcement, MSHA pursued 2 strategies. The first was to issue citations based solely only on the occurrence of an AWC and the second was, in concert with the US Department of Justice, to investigate practices at mines from which suspicious samples came.

The first strategy was a failure. After MSHA issued citations, mine operators as a group challenged the citations. A long and tedious evidentiary hearing followed in which the sole issue before the administrative law judge was whether the occurrence of the AWC was sufficient to issue citations.17

MSHA claimed that occurrence of an AWC was sufficient evidence. The administrative law judge hearing the case required MSHA to show that AWC samples could have occurred only through someone blowing on the filter. This standard of proof was itself a prominent controversy in the case. If there was any other way that an AWC could have been created, the administrative law judge stipulated, then MSHA could not issue a citation based solely on its occurrence. Industry experts testified at length that there were other ways they could have been created. In the end, sufficient doubt was created in the mind of the administrative law judge that he rejected MSHA's citations.

A second piece of evidence that MSHA introduced was that as soon as MSHA announced that AWC samples would be rejected, their occurrence fell off rapidly. MSHA claimed that this demonstrated that mine operators controlled their occurrence. When plotted over time, there indeed seemed to be a precipitous decline in the frequency of AWC samples soon after MSHA made this announcement on March 26, 1991. Before that date, about 6.5% of all samples had AWCs, but afterwards fewer than 1% did. At some specific mines, the percentage of AWC samples dropped from 25% to zero.

But the industry's statistical expert managed to undermine this interpretation. He showed that the decline in the frequency of AWC samples also correlated with dates of manufacture of filters that were more common among the AWC samples than others and that therefore manufacturing anomalies were a plausible explanation. He also argued that the decline in the occurrence of AWC samples began in September of the prior year and that there was no discontinuity around the date of the announcement. It is also plausible that mine operators could simply have not submitted AWC samples, regardless of whether they were fraudulent.

The judge, sufficiently persuaded by the industry's statistician, concluded that MSHA had failed to carry its burden of proof with this argument also. In addition to invoking the industry's statistician, he also stated that AWC samples continued to appear long after the announcement and long after considerable publicity about the case. Statistical correlation, he concluded in brief, was not sufficiently persuasive evidence of intentional tampering.18

However, the administrative law judge allowed MSHA to bring a case against a specific mine, Keystone's Urling mine in Pennsylvania. MSHA brought the case, lost before the administrative law judge, appealed to the Federal Mine Safety and Health Review Commission, lost, appealed to the Federal District Court, and lost again.19

At one point during the appeal, dust technicians, in a bizarre celebration of incompetence, described their rough treatment of dust-monitoring instruments in an effort to demonstrate how the AWCs could have been created some other way than by blowing through the cassette filter. The judge summarized their testimony as follows:

[A dust technician] at Urling occasionally dropped cassettes on the floor when removing them from the sampling head or pushing in the plug. . . . [Another dust technician] has dropped pumps while carrying them from the Urling mine. He has had hoses catch on the car door and latch and on the drawer handles in the safety office. He has dropped cassettes when pulling them from the sampling head. He has stepped on hoses and has seen others step on hoses. When carrying loose pumps, [he] usually carried [them] by the hoses. He has placed pump-carrying boxes on the table in such a way that the hoses were caught under the box. . . . [A third dust technician] testified that when he placed pumps with the hoses wrapped around them in a carrying box, he had to push them into the box, thereby compressing the hoses on both sides of the pump. [He] used the trunk of his car to transport the pumps and samples and is certain that at times he shut the trunk lid on hoses or caught the hoses on the trunk latch.20

During the 1978 hearings, at least one miner testified about nearly identical practices as evidence of the carelessness of persons taking dust samples for mine operators.21 At that time, however, it was offered as evidence that samples were not trustworthy. With this case, 14 years later, it was offered in a mine operator's defense, as an example of practices that could have resulted in AWC samples. That samples taken under these conditions were not valid was a foregone conclusion, but the implications in 1978 were completely different from those in 1992.

The second MSHA strategy—to investigate sampling practices more comprehensively and with the help of the Justice Department—was more successful but less publicized. MSHA gathered enough evidence to convict over 200 mine operators and their contractors on criminal charges of submitting fraudulent samples.22 Some of these mines were first identified because they had submitted AWC samples. But unlike the AWC cases discussed above, in these, the AWC samples were treated merely as one piece of evidence among others rather than the sole piece of

evidence. MSHA gained convictions and punished the perpetrators by withdrawing certification papers, issuing fines, and placing the perpetrators under house arrest.

One of the largest operators in the nation was the first to be convicted. So compelling was the evidence that the operator entered a guilty plea on 13 counts of falsifying dust samples, including submitting AWC samples, taking samples outside the mine, and not taking samples at all but submitting blank filter cassettes.23 Other convicted operators took dust samples in the supply room at a mine and blew dust off the cassettes to reduce their weight. One consultant firm provided bogus, so-called "designer" samples to mine operators that they in turn submitted to MSHA as bona fide samples. Some operators would move the sampler to well-ventilated parts of their mines instead of at the face where it belonged. These and other practices bear a striking resemblance to the practices that miners had spoken of since the early 1970s and had formally testified about in 1978.

Attachment
11

Review of the Program to Control Respirable Coal Mine Dust in the United States

Report of the Coal Mine Respirable Dust Task Group

U.S. Department of Labor
Lynn M. Martin, Secretary

Mine Safety and Health Administration
William J. Tattersall, Assistant Secretary

June 1992

Excerpts from:

Review of the Program to Control Respirable Coal Mine Dust in the United States

United Mine Workers of America
June 20, 2019

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On April 4, 1991, Secretary of Labor Lynn Martin announced the issuance of 4,710 citations by the Mine Safety and Health Administration of the U. S. Department of Labor (MSHA) to over 500 companies for tampering with respirable coal mine dust samples at nearly 850 coal mines. These citations resulted in the proposal of civil penalties against mine operators totaling some $6.5 million. Concerned about the widespread tampering and its impact on the integrity of the program to control respirable coal mine dust, the Secretary directed **MSHA** to thoroughly review the program and make recommendations for improving it.

In May 1991, Secretary of Labor Lynn Martin directed the Mine Safety and Health Administration (MSHA) to conduct a thorough review of the program to control respirable coal mine dust and to develop recommendations for how the program could be improved. **This request followed Secretary Martin's April 1991 announcement of widespread tampering with respirable dust samples taken by mine operators at nearly 850 underground coal mines.** These dust samples are an essential part of MSHA's program to protect miners from coal workers' pneumoconiosis, more commonly known as "black lung."

In response to the Secretary's directive, Assistant Secretary for Mine Safety and Health William Tattersall established an interagency task group to study and recommend improvements to the coal mine respirable dust control program. The Coal Mine Respirable Dust Task Group, hereafter referred to as the "Task Group," was directed to consider all aspects of the current program including expanding the role of the individual miner in the sampling program; to examine the feasibility of MSHA conducting all sampling; and to consider the development of new or improved monitoring technology, including technology to continuously monitor the mine environment.

The potential for unrepresentative samples has resulted in an ongoing debate within the mining community over the concept of operator sampling. The recent revelations concerning fraud in the operator sampling program have heightened the concern over whether operators should be given the responsibility to gather and submit samples upon which MSHA makes compliance determinations. Critics of the operator sampling program contend that there is simply too great an incentive to manipulate the program, and that a lack of adequate MSHA oversight makes it far too easy for some operators or miners to do so. These critics urge that MSHA assume responsibility for the collection of all samples of the mine environment used for compliance determinations.

RECOMMENDATIONS

The Task Group has concluded that new technology for continuous monitoring of the mine environment and of the parameters used to control dust offers the potential to improve the integrity of the enforcement program and to further improve miner protection from excessive levels of respirable coal mine dust. A detailed discussion of the potential for this new technology is contained in Appendices E and F. Because the Task Group does not recommend that MSHA take over the operator sampling program, for reasons discussed below, the present operator sampling program should remain in place until continuous monitoring equipment is available. The Task Group's review of the existing respirable dust control program revealed that both the design of the existing program and **MSHA's** ongoing enforcement activities could be strengthened.

Accordingly, the Task Group has formulated long-term recommendations that focus on the development and implementation of new and improved technology, along with recommendations for improving the existing respirable dust control program.

Improvements in the Current Respirable Dust Program

Because the estimated time frame for the introduction of continuous fixed-site monitors into mines is three to five years or longer, the Task Group recommends that the Agency initiate improvements to the existing program. The degree to which these recommendations are adopted and implemented should be based on the progress of research to develop the fixed-site continuous monitor.

The Task Group's review of the existing respirable dust control program focused on the four elements identified as basic to an effective health protection program. The recommendations to improve the program are structured accordingly.

Monitoring of the Work Environment

The Task Group has identified four areas where monitoring of the work environment could be improved while utilizing current technology: 1) minimizing the likelihood that unrepre- sentative samples will be collected or submitted; 2) collecting the required number of operator samples; 3) ensuring that the sampling scheme is responsive to sampling results showing overexposure; and 4) minimizing the voiding of representative samples. These matters are discussed below.

1. Unrepresentative Samples

The Task Group has been charged with addressing the issue of whether the Agency or the operator should be responsible for conducting compliance sampling. This issue arises directly from the concern over unrepresentative samples. Some in the mining community, particularly labor interests, argue that this concern would be addressed in large measure if **MSHA** were to assume total responsibility for the collection of dust samples. Under this approach, an operator would not be able to adjust or select the mining conditions under which samples are collected, or the location where samples are taken. The opportunity for tampering with samples would also be minimized because of MSHA's presence at the mine site.

However, the Task Group does not recommend that the Agency assume this responsibility. While there has been abuse in the current program, the majority of operators do not engage in such conduct. When there is such abuse, the Agency has demonstrated its commitment to strong civil and criminal enforcement action. Moreover, an operator sampling program is consistent with the Mine Act, which contemplated that the operator will have responsibility for the collection of respirable dust samples used by MSHA in making compliance deter- minations.33

From a practical standpoint, MSHA's assumption of total responsibility for sampling could impact negatively on other Agency safety and health activity. Currently, operators are required to sample each operating mining unit every bimonthly period. In order for **MSHA** to conduct all sampling, the Agency would need to redirect significant resources or obtain additional resources to match this sampling frequency, or the number of samples collected would have to be significantly reduced. Also, the future adoption of a program based on continuous fixed-site monitoring would significantly reduce the need for either the operator or MSHA to conduct periodic sampling. Consequently, the near-term expenditure of re- sources to develop and implement a full-scale MSHA sampling program using current technology may not be a practical option.

The Task Group believes that the existing operator sampling program can provide adequate assurance that miners will not be exposed to unhealthful levels of respirable coal mine dust until continuous monitoring is feasible, if appropriate improvements are made in the program. To increase confidence in the existing program, the potential for the submission of unrepresentative operator samples must be minimized. Accordingly, the Task Group recommends:

MSHA should redefine "normal production shift" to reflect actual production during normal work cycles. The Agency should also develop a means to verify actual production levels of individual mining units.

Efforts are currently underway to develop a dust cassette that inhibits removal of dust from the filter. MSHA should require the use of the new cassette when it becomes available. MSHA should also consider requiring the use of other equipment to make the entire sampling process as tamper-resistant as possible, including enhancement of the integrity of the pump and sampling head assembly.

MSHA should continue to examine samples that show no weight gain, and should also develop a screening system to identify samples with dust levels that are unusually low given the mining method and the production level reported.

Current regulations limit the duration of sampling to the entire shift or eight hours, whichever is less. As a result, miners who work nontraditional shifts of more than eight hours are not being adequately monitored under the existing regulations. **MSHA** is currently addressing this issue for substances other than respirable dust in its rulemaking on Air Quality, Chemical Substances, and Respiratory Protection Stan- dards.34 Once MSHA determines how it will address miner exposure to other contaminants during novel work shifts in the final regulation on Air Quality, the Agency should implement a similar approach for respirable coal mine dust.

To minimize the potential for operators to select sampling periods that do not reflect normal mining conditions and to determine whether operators are complying with dust sampling procedures, MSHA should institute a formalized program for monitoring the conditions under which operator sampling is performed. MSHA should require operators to provide the Agency with advance notice of their sampling schedule.

MSHA should require operators to have in place security measures to safeguard the integrity of the entire sampling process.

2. Failure of Operator to Collect the Required Number of Samples

MSHA records show that a significant number of mine operators have failed to collect samples as frequently as the regulations require. This hampers MSHA's ability to determine whether operators are complying with the applicable dust standard and whether the operator's dust control practices continue to be effective. In some cases, there may be legitimate
reasons why an operator has not submitted samples, such as a bimonthly period when production is unpredictably intermittent and there has been insufficient time for sample collection. However, there is no Agency policy setting forth the circumstances under which operators should be cited for failing to sample. It is clear that the level of civil penalties assessed against operators who fail

to conduct bimonthly sampling does not serve as an adequate deterrent. Accordingly, the Task Group recommends:

The Agency should examine its current policy regarding the collection of samples during a bimonthly period, and should review all violations for failure to sample for special assessment or for increased gravity and negligence evaluations.

3. Sampling Scheme is Unresponsive to Sample Results Showing Overexposure

The current MSHA inspection program is not designed to respond to individual samples showing overexposure. Existing spot inspection data show a significant number of instances where the dust concentration over a single shift exceeds the applicable standard. Outside of the recent spot inspection program, MSHA historically did not issue citations based on single sample results. Providing for the option of making a compliance determination based on either a single sample or the combined average of multiple samples will afford a greater degree of health protection to the miner, as intended by the Coal Act as it will result in operators taking more immediate corrective action. Accordingly, the Task Group recom- mends:

MSHA should institute a program that utilizes Agency single-sample measurements in addition to the average of multiple sample results for compliance determinations.
Also, while making no specific recommendation, the Task Group suggests that the Agency study the appropriateness of making single-sample compliance determinations based on samples submitted by the operator during bimonthly periods.

MSHA should revise its policy to eliminate the present multiple-shift respirable dust inspection program and institute a program that provides for more frequent one-day respirable dust spot inspections.

4. Voiding of Valid Samples

The voiding of samples at the request of the operator raises the possibility that some valid representative samples may not be considered by **MSHA** in making compliance determina- tions. This is due to the fact that in many cases **MSHA is** unable to verify the information supporting the request. Therefore, the Task Group recommends:

MSHA should review its existing policy regarding the voiding of samples to minimize the potential for invalidating representative respirable dust samples.

Control of Worker Exposure

Providing and maintaining a work environment free of excessive levels of respirable dust is essential for long-term health protection. The Task Group has identified three areas where improvements would strengthen the control of worker exposure. They involve quality of dust control plans, compliance with plans, and primacy of controls.

1. **Quality of Plans**

Dust control plans demonstrated to be effective under typical mining conditions are essential to preventing overexposures. However, plans may be approved when the production achieved during plan verification is significantly lower than normal production, raising doubts about the plan's adequacy at higher production levels. Additionally, MSHA sampling for plan verification may not be of sufficient duration, given other fluctuating variables that affect dust levels, to enable an accurate assessment of plan effectiveness.

Although periodic MSHA sampling is essential to verify the adequacy of the operator's efforts to control respirable dust levels, the Agency has not sampled every mining unit annually in accordance with current inspection procedures. The Task Group also concluded that, in some cases, dust control plans lack specificity or do not reflect the measures that are actually being used in the mine to control respirable dust.

Finally, while operators are required to take appropriate action to correct a violation of the dust standard and to sample for the purpose of demonstrating compliance, the Agency does not routinely require the operator to include those measures that were taken to abate the violation in a revised dust control plan. This is true even when operators must employ enhanced control measures beyond what is called for in the plan to achieve compliance. Consequently, compliance with the plan does not guarantee that miners will not be overexposed. Accordingly, the Task Group recommends:

MSHA should develop uniform plan approval guidelines that incorporate minimum acceptable dust control parameters for each method of mining.

MSHA should rescind its policy of making determinations of plan adequacy when production levels are as low as 60 percent of the mine's average, and only approve plans that are demonstrated to be effective at typical production levels.

MSHA should revise its policy to require coal mine operators to provide verification of the adequacy of dust control plans submitted to the Agency for approval, demonstrating that the plan will be effective under typical mining conditions. One method for an operator to

accomplish this is through sampling over an extended period of time, to increase the likelihood that verification samples reflect typical dust levels.
The Agency should also require a responsible mine official to verify that the plan's supporting data are accurate and reflect representative mining conditions.

MSHA should revise its policy and review dust control plans whenever noncompli- ance is demonstrated with the applicable dust standard, and require the operator to incorporate in the plan those control measures that are determined to be necessary to achieve and maintain compliance.

2. Compliance with Plans

Once an effective dust control plan has been designed, its continued implementation is vital to preventing overexposure. However, recently obtained spot inspection data show that some operators are not complying with their plans on a continuous basis, and there are no systematic procedures in place requiring operators to routinely monitor the status of the dust control measures. Accordingly, the Task Group recommends:

MSHA should increase its monitoring of operator dust control practices during respirable dust spot and regular inspections to ensure compliance with the mine's dust control plan.

MSHA should require coal mine operators to make periodic on-shift examinations to verify that the plan parameters are in place and functioning as intended.

3. Primacy of Controls

The most effective dust control strategy to minimize the potential for miner overexposure to respirable dust is the application and use of environmental control methods. Control of the work environment gives reasonable assurance that all miners in the area will be adequately protected. This is consistent with the Act, and may serve to encourage the development of new dust control technology. However, the Task Group has concluded, based on its review of selected dust control plans, that there is a growing trend toward the use of administrative controls when additional feasible environmental controls could be implemented, primarily at mines employing longwall mining systems. While administrative controls may be attractive to mine operators because they may be easier and less costly to apply and maintain in the short term than environmental controls, they have the potential to be less reliable.

Currently, operators are required to make available approved respirators to miners during periods of noncompliance, although miners are not required to wear them. While current MSHA policy requires inspectors to consider the use of respirators in determining the gravity

of violations of the applicable dust standard, the Agency has no guidelines for evaluating the effectiveness of an operator's respirator practices.

Accordingly, the Task Group recommends:

MSHA consider ways to improve the effectiveness of its existing policy that operators implement all feasible environmental controls before resorting to administrative controls.

Approved respirators, such as the powered air purifying type, can be effectively used as an interim method of protecting miners when properly selected, used, and maintained. Therefore, MSHA should consider developing policy setting forth guidelines for evaluating the effectiveness of operator respirator programs, to give reasonable assurance miners are protected when such personal protective devices are used, while preserving the primacy of engineering controls.

Education and Training

The Task Group recognizes that education and training is an important part of any effective health protection strategy to prevent occupational lung disease. In order to strengthen the current program, the Task Group has identified two key areas where significant improve-ments could be realized: the certification process for operator sampling personnel and the training of miners under Part 48 of MSHA's regulations.

1. Certification Process

The current certification process is inadequate. The examination is outdated, and MSHA does not require classroom training as a prerequisite to certification. Moreover, the current certification process places no emphasis on the legal obligations of certified persons. Certifications are valid indefinitely, and no refresher training is required to maintain certification. As a result, persons who have been certified may not possess the necessary level of knowledge and competence intended by the regulations. Additionally, the Agency has no formal procedures defining the type of conduct that may warrant decertification action. Lack of formal decertification procedures may inhibit prompt Agency action in those instances when MSHA has reason to believe that an individual has failed to perform the necessary duties competently or responsibly. Accordingly, the Task Group recommends:

MSHA should update the current dust sampling and maintenance certification exami- nation. **MSHA** should also discontinue the practice of publishing the examination questions and answers. Lastly, consideration should be given to revising the regula- tions to require classroom training as a prerequisite to taking the certification exami- nation.

MSHA should establish written criteria defining conduct that may result in the revocation of certification, and should institute a formal decertification process.

MSHA should determine the feasibility of suspending all current certifications and requiring recertification, using new and improved procedures, at specified intervals. Periodic retraining should be required.

2. Training of Mining Personnel

MSHA regulations require training of both new and experienced miners. However, spot inspection data indicate that miners are not fully knowledgeable about the respirable dust control program in effect at the mine. Accordingly, the Task Group recommends:

MSHA should review, and revise as appropriate, Part 48 training and retraining requirements to increase miners' knowledge of the health hazards of respirable coal mine dust, the importance of effective dust sampling and control, and the miners' role in the sampling process. Miners should also receive instruction in correct sampling procedures, so that they will recognize when proper procedures are not followed.
Part of this MSHA review should include an evaluation of actual operator training plans and the quality of the operator training.

MSHA should develop a program to assist operators and miners in providing and maintaining a healthful work environment. The program should be patterned after the Job Safety Analysis Program (JSA), using the same concepts and elements of the JSA, as appropriate.
Implementation of the program should incorporate input from all segments of the mining industry.

Medical Surveillance

During the recent hearings before the Subcommittee on Appropriations regarding tampering with coal mine dust samples, Dr. J. Donald Millar, Director of NIOSH, indicated that medical surveillance was essential to preventing coal-related occupational lung diseases.
Efforts must be made to detect those miners who are developing the disease so that they can be spared further exposure to coal mine dust and further progression of disease. While mechanisms exist under the existing program to address these issues, the Task Group found that participation by miners in the NIOSH X-ray Surveillance Program historically has been low. This matter should be addressed by emphasizing to miners the need for them to fully participate in this essential program. Therefore, the Task Group r e c o m m e n d s :

MSHA should emphasize the importance of miner participation in the X-ray Surveil- lance Program in Part 48 Training. The Agency should also consider establishing a health outreach program to convey this message to the mining community.

Role of the Miner in the Respirable Dust Program

One important means of improving the dust sampling program is to encourage increased involvement of miners in the process. The miner should be familiar with the hazard of overexposure to respirable dust, appropriate sampling procedures, and engineering controls required by the dust control plan. Accordingly, the Task Group recommends:

MSHA should stress the importance of the miner's role in recognizing and reporting to MSHA any irregularities in the sampling process, or any unhealthful work prac- tices.

MSHA should encourage miners or their representatives to participate in reviewing and providing input into dust control plans proposed by the operator

Long-Term Program Improvements

Technology is at the threshold where fixed-site dust monitors and dust control parameter monitors can be developed. Monitors strategically located in the work place or mounted on the mining equipment would permit the environment of the mine and the parameters essential to the control of dust to be continuously monitored. Information provided by continuous monitoring devices would provide real time data that can be used by mine personnel to achieve control of hazardous dust levels. The information can also be transmitted to a central data gathering site for processing. Although the development of monitors is feasible with existing state-of-the-art technology, a commitment of resources will be required in the area of research to develop, evaluate and integrate this instrumentation into the mine environment.

The Task Group recommends the following actions to achieve the goal of continuous monitoring of the mine environment:

An accelerated research program to evaluate existing state-of-the-art technologies having the potential to be used in the development of a fixed-site underground coal mine dust monitor. Applicable technologies to be considered are light scattering, tapered element oscillating microbalances and beta sensing gauges. The ultimate goal is to have an instrument that can be used as a fixed-site monitor that will provide continuous information to the miner and mine operator on the status of dust resulting from the mining process as well as information on the status of compliance with respect to the applicable respirable dust standard; The monitor is also expected to have the capability of cutting power to mining equipment whenever applicable dust standards are demonstrated to be exceeded. Application of a fixed-site monitor to MSHA's dust enforcement program is expected to be similar to that of the current methane monitor.

An accelerated research program to develop instrumentation for continuously monitoring the parameters (ventilating air quantity, water consumption, entry velocities, etc.) used to control dust.

A research program to develop a device for measuring full-shift personal respirable dust exposures and for use as a hand-held detector for determining the efficacy of methods used to control dust. This would be a device similar to the **MINIRAM, an** instantaneous dust measuring instrument that uses the principle of light scattering to measure the amount of dust in the environment. However, unlike the MINIRAM, the instrument developed should provide a direct measure of the mass of dust to which an individual is exposed. The device should be capable of providing both a short-term measurement (five to ten minutes) as well as a determination of the average full shift respirable dust exposure. In designing the instrument, primary consideration should be given to minimizing weight and size and optimizing resistance to tampering.

Longwall mining systems currently represent the state of the art in underground coal mining methods. However, this technology brings with it higher levels of respirable dust, new dust sources, and the need to identify new concepts for controlling dust from these sources. Accordingly, the Task Group recommends:

MSHA should encourage the development of new or improved dust control tech- nology, with special emphasis on dust control methods for high-production longwall mining units and other mining operations experiencing difficulty in maintaining consistent compliance.

APPENDIX E - Review of Monitoring Technologies

In addition to evaluating the current respirable dust control program, the Task Group was directed to consider the development of new or improved monitoring technology, including technology to continuously monitor the mine environment. The Task Group conducted an extensive evaluation of current state-of-the-art aerosol measurement technologies and identified the long-term research necessary for effective monitoring of respirable dust in the mining environment. Information on available hand-held and fixed-site instruments was reviewed to determine if these devices could be used as continuous or shift-average monitors. The Task Group also studied available information on technologies that could be used in the development of a new personal dust monitor.

This review indicated that, given the current state of technology, monitors can be developed to provide mine personnel with current information on the status of environmental dust levels. However, additional research is needed to complete development of such monitors, to evaluate the effectiveness of these devices, and to integrate this instrumentation successfully into the mine environment.

Approximately ten years ago, MSHA developed a continuous light-scattering respirable dust monitor for use in underground mines. The Agency determined at that time that this technology could be used to monitor the effectiveness of dust controls. Current fixed-site light-scattering monitors are used in the United Kingdom to monitor dust levels in the return airways. These monitors incorporate a standard gravimetric system that verifies the accuracy of the light-scattering measurement. This combination of measurement methods allows the recording of a multiple shift dust profile while collecting a physical dust sample. However, this instrument is presently not suitable for machine mounting and has inherent maintenance problems when used over a long term. Other technological issues that remain to be addressed are: accounting for the presence of water drops; rendering the sensing mechanism and the monitor sufficiently durable for intended use in mine environments; and designing the equipment to be tamper-resistant.

Recent disclosures of tampering have highlighted questions about the integrity of the measurement obtained by the current sampling unit and the need to make the system more tamper-resistant. Equipment modifications to reduce potential tampering could be addressed within the year. Although the current unit can be made more tamper-resistant, elimination of all possibility of tampering is not considered practical or feasible at this time.

Technology is currently available for the development of a short-term, direct-reading personal sampler that would allow continuous feedback to miners on the environmental dust levels. Such an instrument could be developed employing a combination of light-scattering technology and standard gravimetric methods. The light-scattering device would provide a direct reading, while

the gravimetric method would provide the time-weighted average results required for compliance purposes.

Recent advances in electronic signal processing and sensing technologies make the development and implementation of a mine-worthy, continuous personal and fixed-site monitor feasible within the next three to five years.

The development of the personal and fixed-site continuous monitoring devices offer the potential to significantly improve monitoring of the work environment and control of worker exposure. Such instruments will allow the continuous measurement as opposed to periodic measurement of dust concentrations under the existing program. Furthermore, worker exposure to excessive levels of dust would be minimized because mine personnel would be aware of the actual dust conditions in their work environment at all times, and appropriate action could be taken immediately to avert possible overexposure. The focus of dust control could consequently be shifted away from the stipulation of specific measures in the operator's dust control plan.

The vulnerabilities associated with unrepresentative samples would be addressed in large measure by the introduction of continuous monitoring of the work environment. Under continuous dust monitoring, occasions for altering production, selecting optimal conditions for sampling, improperly voiding samples, or failing to sample would no longer exist to any appreciable degree. Such an approach would minimize the potential for tampering because the devices would be located at fixed sites, operate continuously, and be in clear view of miners. Although the identification of the occupation to be sampled would no longer be necessary, the proper number and location of fixed-site monitors would need to be deter- mined.
The status of technology that could be applied to continuously monitor the parameters that are used to control dust was also evaluated. Such parameters include ventilation, the quantity and pressure of the water supplied to control dust and mine entry air velocities. Technology for monitoring water pressure and quantity exist; therefore, research for further development of equipment to monitor these parameters is not required. However, questions remain concerning the ability to successfully monitor other parameters, such as the ventilation airflow rate.

APPENDIX F - Status of Dust Control Technology

Since the passage of the Coal Act, the primary method used by mine operators to control dust at underground mining operations has been through the proper application of ventilation and water. Over the last twenty years, the Bureau of Mines has conducted extensive research on new technologies for the control of dust at mining operations, and has improved the application of ventilation and water for this purpose. Examples of the technologies developed include: integral scrubbers on continuous mining equipment; improvement of the coal cutting process, both at continuous and longwall mining operations; and improvement of the use of water to create and direct air currents, and to remove dust from the e n v i r o n m e n t .

Current technology, when properly applied, is sufficient to control the dust generated by conventional and continuous mining methods. However, the control of dust generated by longwall mining systems continues to be a problem. Approximately 25 percent of the long- wall mining operations are out of compliance with the applicable dust standard at any one time.

The problem of respirable dust control at operations employing longwall mining methods could present a major limitation on the application and production potential of this advanced mining technique. This is particularly evident from operator bimonthly sampling data that show that the average longwall production per shift has increased over 25 percent during the past five years from 2300 tons in 1987 to over 2900 tons in 1991. Also, the proportion of underground coal produced by longwall mining techniques has doubled over the past eight years. If the coal mining industry is to meet projected production gains through the use of longwall mining systems, new and improved methods of dust control must be developed and implemented.